

May 13, 1976

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Dear Harold,

As you know well enough from the fact, I am not a very good correspondent although I hope I managed to come through in the clinches at least in some nicks of time.

I did however just want to thank you for having done such a statesman-like job of chairing the Committee on Ground-water Recharge. From the standpoint of both the technical content and the interpersonal relationships it was a delight to see how you managed it. And I think the outcome shows the requisite signs.

I was certainly intrigued to see your notes on water softening. If you have copies of your earlier writings on the subject, I would be interested to see them since they are not in the medical library here. You seem to be coming to the point that it is the balance between univalent and divalent cations that may be the critical parameter and that secondary effects through gustatory behavior may be the amplifier. What an ingenious idea!

Now that you bring it up, one wonders about the whole totality of dietary habit that may be subtly influenced by the mineral content of water, and by no means to confine this to sodium. In fact, in reflecting on the European habit of using carbonated water, I have wondered if b~~y~~-carbonate may not also play a role as a feedback inhibitor of gastric acid secretion. (This may be how alka-seltzer really works rather than the prevalent doctrine of direct neutralization of acid!) Use of such waters at meals should have been a hint in the gustatory direction that you clearly pointed out.

But what else do people perhaps do in response to the taste of their water. The length to which people will go in seeking their own taste preferences is again an index of the amplitude of that amplifier. It is time to think of some more explicit measures of dietary outcome that might correlate more directly with the disease outcome.

As far as the report itself is concerned, my main afterthoughts are:
1) that I would stress that one has to take a more cautious posture before permanently institutionalizing a major resource commitment than in the casual acceptance of ad hoc experiments. This is implied in our endorsement of ongoing trials but one could make a more explicit point of it.

2) I guess I am more concerned than I was before about the long-term fate of viruses (and by no means forget viroids!) in interacting with soil. Since the meetings of our group, there have been several papers from Melnick's laboratory which indicate that viruses are often tenaciously adsorbed to soil particles without necessarily being inactivated; although this is difficult to measure in the circumstances. We may have some difficulty in understanding the long-term implications of heavy seeding of a soil basin with human viral sources.

My mention of viroids was intended to open the general concern that we still do not know all of the viruses about which we will have urgent environmental concerns in the future. What a fuss people are making about recombinant DNA when we have all of the unknowns of our techniques of sewage disposal right in front of our eyes!

3) Finally, the emphasis that you added that we were talking about surface spreading rather than injection techniques led me to wonder whether we had given enough thought to the long-term uses of the acreage through which water was percolating. We have to add some questions about the potential problems of reclaiming such lands for uses other than percolation as part of the overall consideration. Alternatively, we may need a regulatory framework that commits such lands more or less indefinitely or at least until such problems are understood, so they are not released for recreational or perhaps certain agricultural uses with somewhat dimly understood consequences. I do not have a clear idea in front of me of the quantitative cross-section of percolating surface per human producer of effluent that might give a better notion of the kind of load that is in question.

These are all, however, very minor addenda to a report in the formulation of which I was indeed very happy and proud to serve.

Sincerely yours,

Joshua Lederberg
Professor of Genetics

JL/rr